Hideaki OHBA*: **The juvenile plants of *Phlomis rotata* (Labiatae), with a taxonomic note****

大場秀章*: *Phlomis rotata*（シソ科）の幼植物と分類

In our research of the high altitude flora of the Himalayas organised by the University of Tokyo, I have taken an interest in the curious plants with unusual forms in various taxonomic groups. *Phlomis rotata* Benth. ex Hook. f. (Labiatae), having a rosette of large rounded leathery leaves pressed flat to the ground and ranging from eastern Himalaya to SW China (Yunnan and Szechuan) eastward and Tsinghai and Kansu northward through Tibet, is one of the most curious plants in the high altitudes of the Himalayas. Hooker (1885) described this as stemless, annual?, and leaves rotately spreading. Kudo (1929) created a monotypic genus, *Lamiophlomis*, based on this species. The stemless nature with a rosette consisting of large spreading leaves seems to be regarded by him as significant features. Wu (1959) and Wu & Li (in Wu 1977) adopted his genus and thought much of the curious, stemless nature of this species.

Present observation was done on 25 July 1985 at Bigphera Lho Glacier in Rolwaling Himal, Central Nepal where the population consisting of about thirty individuals grew on the rocky bank at ca 4700 m in altitude. The voucher specimen is deposited in TI: Nepal, Janakpur Zone, Ramechhap Distr., Bigphera Lho Glacier, alt. ca 4700 m (Ohba *et al.* 8530505).

Observation and discussion The juvenile plants (Fig. 1A and B) look quite different from that with a rosette of four or six, large round leaves (Fig. 2). The illustrated plant in Fig. 1C has flowers but it is vegetatively transitional from these juvenile to that with the prominent rosette. It is remarkable that *Phlomis rotata* has an elongate stem not only in the juvenile but also in even matured flowering stages as shown in Fig. 1C. I noticed that the stemless individuals were found to grow on flatter, moss-covered soil-ground while stemmed ones without the prominent rosette were among rocks or rock crevices. In my opinion,

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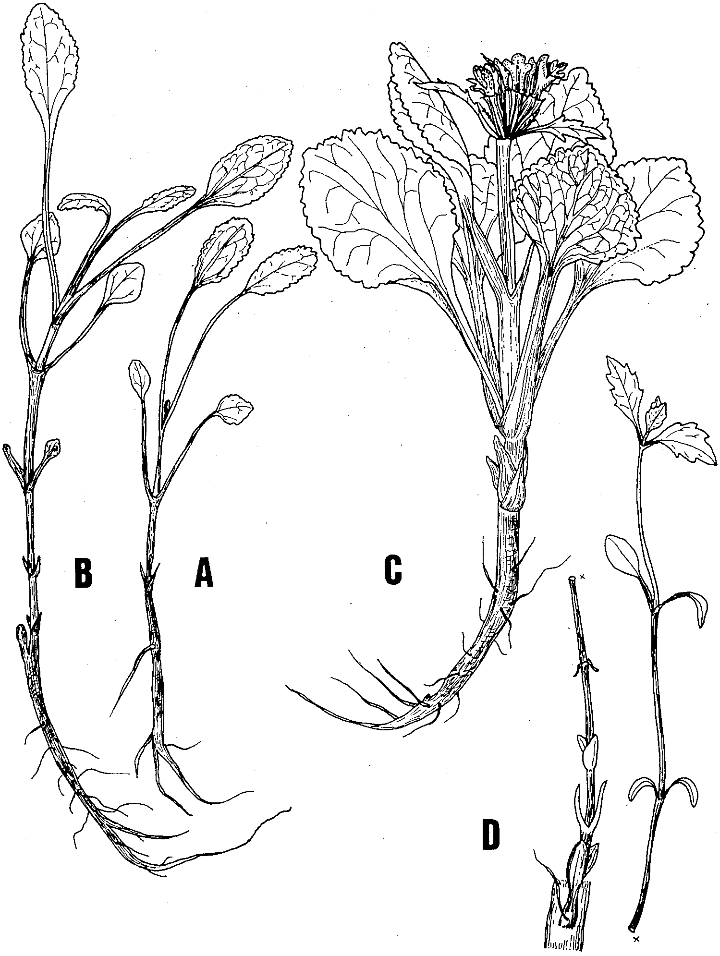

Fig. 1. *Phlomis rotata* (A–C) and *Eriophyton Wallichii* (D). A, B & D. juvenile plants, ×ca 1/2. C. stemmed flowering plant, ×ca 1/8.

whether to produce rosette or not is a matter of chance. That is, if it grows on flatter rich soil-ground, the internodes are conspicuously reduced (i. e. it is descibed as stemless) and leaves spread flat to the ground.

It is remarkable that no first-year seedling was found in the population observed and other places at least between June and September. The juvenile plants as

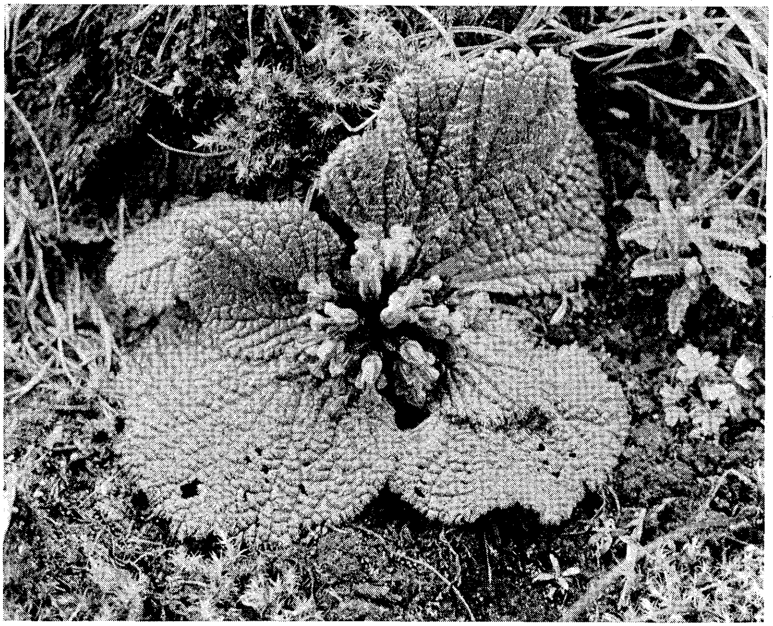

Fig. 2. *Phlomis rotata.* C. Nepal. Bigphera Lho Glacier on 25 July 1985.

shown in Fig. 1A and B lack cotyledons or the rudiments, and are thought to be more than two years old, if they have grown from seed. It can be thought that *Phlomis rotata* is reproduced vegetatively by the outgrowth of subterranean stems of the aged individuals. It should be noted this species is not annual but monocarpic and has a stem of which aerial part is annual. That is, the aerial part of the stem dies every year but the subterranean basal part remains and produces some adventitious buds. These buds become new individuals in the following year. As shown in Fig. 1C the inflorescence is, by nature, terminal with a long (often much shorter) axis.

In the high altitudes of the Himalayas the duration of growing season for higher plants is extremely reduced. In a case at Phujeng La in alt. 4800 m in East Nepal, the growing season is thought to start in the late June and end in the middle of September, so that the duration of the growing season can be estimated at approximately 10 to 11 weeks (Ohba 1982). In the duration Rolwaling Himal may be similar to Phujeng La. Such a short growing season is not enough to make reproduction from seeds and seems to favour vegetative reproductions. In facts various kinds of vegetative reproductions are known in the high altitude plants of the Himalayas. The reproduction of *Phlomis rotata* is similar to that of *Eriophyton Wallichii* Benth., another curious Labiataeous herb in the Himalayan high altitudes, of which the juvenile individuals are the axillary outgrowth of scale-like leaves (Fig. 1D).

In *Phlomis rotata,* leaves from one or two basal nodes are subterranean and scale-like while foliage leaves come forth from above two or three or even four nodes. Some transitional forms between the foliage and scaly leaves are also found. Foliage leaves are not sessile but better to be described as petiolate. Particularly in younger stages, the leaves have petioles being longer than the laminas. Even long petiolate leaves have conspicuously rugose laminas similar to those of the large, spreading rosulate leaves. The shape of the laminas changes from narrowly oblong or spathulate in juvenile stages to broadly oblong or ovate or nearly circular in flowering stage.

In taxonomic conclusion the differences found in the vegetative features are regarded as specific. Moreover, the floral features of *Phlomis rotata* are not essentially differentiated from those of other species of *Phlomis* as far as examined. In such circumstances *Lamiophlomis* based on *P. rotata* should be considered to fall into the synonymy of *Phlomis.*

Phlomis rotata Benth. ex Hook. f., Fl. Brit. Ind. **4**: 694 (1885)—Press in Hara *et al.*, Enum. Fl. Pl. Nepal **3**: 161 (1982).

Lamiophlomis rotata (Benth. ex Hook. f.) Kudo in Mem. Fac. Sci. Agr. Taihoku Univ. **2**: 211 (1929)—C.Y. Wu in Acta Phytotax. Sin. **8**: 33 (1959)—C.Y. Wu et H.S. Li in Fl. Reip. Pop. Sin. **65**(2): 480 (1977).

Distr. Eastern Himalaya (Nepal to Bhutan), Tibet, SW China (Yunnan & Szechuan), Tsinghai and Kansu.

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ヒマラヤ高山帯植物相の解析を目的とした調査を1983・85年に行なったが，この間，様々な分類群に散見される特異な形態をした植物にたいへん興味をそそられた。ここで取り上げた *Phlomis rotata* Benth. ex Hook. f. もそのひとつで，Hooker は，“無茎で地際に4ないし6個のかなり大きな葉からなるロゼットをもち，その中心に花序を頂生し，しかも一年生?” と記した。工藤博士は Hooker の取り上げた特徴により，この種だけからなる単型属 *Lamiophlomis* を設けた。この説は呉征鑑先生（1959）にも受け入れられ，最近の中国植物志もこれに従っている。

1985年中部ネパールの Bigphera Lho 氷河の海抜約4700 m の地点で，本種を見いだすことができ，観察を行なった結果，いくつかの新知見を得ることができた。本種は無茎とされているが，幼形ばかりでなく花を着けた個体でも伸長した節間を有するものがある。節間が伸長した個体は，岩の間隙に生えており，葉は斜上し，ロゼットを作らないが，節間が極端に短縮した個体は土壌ができコケ類などで覆われた比較的平坦なところに生育し，地表に広がる葉からなるロゼットを作る。Hooker が記載したようなロゼットを有する個体だけが決して成熟個体であるのではなく，ロゼットをつくるかどうかは生育場所によると考えられた。幼形とみられる個体もかなり見られたが，子葉やその痕跡は見られず，大きさからして発芽一年目と考えられるものは見いだせなかった。これらの幼体は腋生枝が分離したものと考えられる。毎年地上部は枯れるが，地下部は残り，腋芽をだす。花序をだすと枯れると考えられるので，本種は一稔性である。

同じシソ科の特異な形態をした *Eriophyton Wallichii* も通常は栄養繁殖によっている。10ないし11週間程度の期間で生長を終えねばならない，海抜 4500 m あたりのヒマラヤの植物相にはこのように栄養繁殖を主とする種が多い。

本種の栄養器官の形態にはかなり特徴がみられるとはいえ，多様な種を含む *Phlomis* から本種を別属として区別するほど特殊化したものではない。花の形質にも特殊性は見いだしえなかったので，工藤の *Lamiophlomis* は，分類学上，*Phlomis* から区別する意味がないと考えられる。